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of

Thomas Reiter

Karl-Heinz Sommer

and

Jörg Albert

for

AIRBAG SYSTEM DESIGNED FOR TWO PERSONS

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2
3 BACKGROUND OF THE INVENTION

4 The invention relates to an airbag system for jointly supporting at least two
5 vehicle occupants inside a motor vehicle in case of an accident. The airbag system has at
6 least two separate airbags inflatable by gas supplied by a gas generator.

7 German Patent Specification DE 43 02 891 C2 discloses an airbag system which
8 is designed to support at least two vehicle occupants, especially in the knee region. To
9 this end, the prior-art airbag system has two separate airbags arranged in the center
10 console of a motor vehicle. When triggered, these airbags are inflated by a common
11 inflation device and emerge laterally from the center console so that they extend in front
12 of the knees of the vehicle occupants sitting to the right and the left of the center console
13 supporting them in the knee region.

14 The airbag system disclosed in DE 43 02 891 C2 cannot be used to support the
15 upper body of several, or at least two, vehicle occupants by means of airbags inflatable
16 from the dashboard. To solve this problem it is known from Patent Specification DE 199
17 33 586 C1 or German Laid Open Publication DE 196 20 537 A1 to divide a single airbag
18 into several chambers. The airbag extends in front of the two or more vehicle occupants
19 and consists of a uniform textile blank, using suitable configurations.

20 An airbag system designed in this manner has several drawbacks. Such a system
21 can be optimally configured only for two persons of identical size penetrating the central
22 airbag uniformly. If only one person is to be protected, one problem is that the internal

1 pressure of the large airbag required to produce a corresponding retaining action cannot
2 be reached because the volume of the airbag is too large. In the case of two persons of
3 very different size and different body weight, the vehicle occupants also cannot be
4 optimally protected because the differences in body size and body weight cannot be taken
5 into account. Also, if the vehicle occupants are sitting in different positions relative to
6 the airbag prior to the accident, very different retaining actions result, even for identical
7 occupants. Furthermore, such a single airbag has a very large volume. Since the time
8 required for inflation must be comparable to that of other airbag systems, such a large
9 airbag must be filled with a substantially greater volume flow per time unit. Very high
10 loads can occur especially for vehicle occupants sitting near the area in front of the
11 deploying airbag, i.e. in a so-called out/off position.

12 Thus, an object of the invention is to provide an airbag system which offers both
13 or several vehicle occupants equal protection for the loading cases that have to be
14 assumed.

15 This object, including advantageous embodiments and refinements of the
16 invention, is attained as set forth in the claims following this description.

17 18 BRIEF SUMMARY OF THE INVENTION

19 The invention is drawn to an airbag system with at least two separate airbags
20 inflatable by the gas supplied by a gas generator for jointly supporting at least two
21 vehicle occupants inside a motor vehicle in case of an accident. The invention provides
22 that the airbags are folded into a common housing to be arranged in the dashboard of the

1 motor vehicle and connected to a common gas generator with outflow areas assigned to
2 the at least two airbags. Each airbag is sealed against the other airbag by a deflector
3 inserted therein and is fixed within the common housing.

4 The configuration according to the invention has the advantage that the two
5 airbags are filled by a central gas generator with gas streams adapted to the proportional
6 volume of each airbag. Gas cannot flow between the airbags because associated deflector
7 units individually seal the airbags. However, the two airbags are nevertheless arranged in
8 a common housing, which can be installed as a unit in the dashboard of a motor vehicle.
9 Thus, the airbag system according to the invention is distinguished by simple handling
10 and easy installation.

11 In its basic design, the invention provides for two airbags to be connected to a gas
12 generator, but additional airbags may be incorporated in the invention. If additional
13 airbags are provided, the common housing must be made correspondingly larger, and the
14 gas generator must have correspondingly more outflow areas.

15 According to one embodiment, the invention is further characterized in that the
16 airbags are deployed from the common housing in the same direction.

17 Another embodiment of the invention provides that the gas generator is designed
18 to have a symmetrical outflow capacity in the provided outflow areas, so that the two
19 airbags are inflated symmetrically. Alternatively, the outflow capacity of the different
20 outflow areas may differ, so that different size ratios of the vehicle occupants or different
21 seating positions can be taken into account by controlling the inflation behavior of the gas
22 generator as a function of the accident conditions.

1 If a biaxial type of construction of the gas generator is used, yet another
2 embodiment of the invention provides that the biaxial gas generator has a central
3 combustion system with adjusted gas distribution to its outflow areas. Alternatively, it
4 may also be provided that separate combustion systems respectively are assigned to the
5 outflow areas of a biaxial gas generator.

6 It may furthermore be provided that two gas generators may be arranged in the
7 common housing which operate as a two-stage system to generate the gas, and each
8 airbag is connected to the associated outflow areas of the two gas generators.

9 To simplify installation, it may be provided that the deflectors disposed in the
10 airbags can be mutually connected and installed as a unit in the common housing together
11 with the connected airbags.

12 Other embodiments of the invention provide that the airbags are each folded into
13 the common housing with an identical or with a different folding configuration.

14 It may furthermore be provided that the airbags are each made of an identical
15 material or a different material.

16

17 BRIEF DESCRIPTION OF THE DRAWINGS

18 The invention will now be described by way of example with reference to
19 embodiments depicted in the drawing in which:

20 Fig. 1 is a schematic side view of an airbag system with a housing and two
21 airbags connected to a gas generator;

1 Figs. 2 a-d illustrate the steps required to produce an airbag system according to
2 Fig. 1;

3 Figs. 3 a-d show the steps according to Figs. 2 a-d required to produce an airbag
4 system with a biaxial gas generator; and

5 Figs. 4 a-d show the steps according to Figs. 2 a-d required to produce another
6 embodiment of the airbag system.

7
8 DETAILED DESCRIPTION OF THE INVENTION

9 As shown in Fig 1, a central gas generator 11 is mounted in a common housing 10
10 of an airbag system. An ignition connector 12 is connected to each of the two outer ends
11 of the gas generator 11. A central outflow area 13 is formed in the center of the gas
12 generator 11. Two airbags 14 and 15, separated from one another, are connected to the
13 gas generator 11 by means of deflectors 16 and 17. Deflectors 16 and 17 are inserted into
14 the airbags and produce the connection with the gas generator 11 such that each of the
15 two airbags 14 and 15 covers approximately half the outflow area 13. As a result, when
16 the gas generator 11 is fired, the two airbags 14, 15 are substantially equally inflated
17 through the outflow area 13. The two deflectors 16 and 17 separately seal the two
18 airbags 14 and 15 against the gas generator 11 and against each other so that substantially
19 no gas flows between the two airbags 14 and 15.

20 As illustrated in Fig. 2a, such an airbag system can be installed by first inserting
21 the two deflectors 16, 17 into the associated openings of the respective airbag 14, 15.
22 The deflectors 16, 17 each have a mount 20 in which the gas generator is inserted. In a

1 next step shown in Fig. 2b, the gas generator 11 is inserted between the two deflectors 16,
2 17, which are connected to the airbags 14, 15 and are spaced apart from one another. The
3 two deflectors 16, 17 are then pushed together until they are interconnected, for example
4 by a plug-in connection, and thereby form a unit.

5 According to Fig. 2c, this unit is then inserted into the common housing 10, the
6 shape of which is adapted accordingly, and is fixed to the housing 10. The completed
7 airbag system is shown in Fig. 2d.

8 The embodiment depicted in Figs. 3 a-d is distinguished from that described
9 above only in that the gas generator 11 is a biaxial gas generator with inflation areas 18
10 and 19 arranged along its exterior so that the two airbags 14 and 15 are associated with
11 separate outflow areas. In the embodiment depicted in Figs. 4 a-d the gas generator 11 is
12 arranged below the deflectors 16, 17 in a corresponding housing extension 21 so that the
13 deflectors 16, 17, together with the connected airbags 14, 15 are inserted into the housing
14 10 as a unit and are thereby fixed in a mount located above the gas generator.

15 The characteristics of the subject of these documents disclosed in the preceding
16 description, the patent claims, the abstract, and the drawing can be utilized individually or
17 in any combination for the creation of the invention in its various embodiments. The
18 present invention may be embodied in other specific forms without departing from its
19 structures, methods, or other characteristics as described herein and claimed hereinafter.
20 The described embodiments are to be considered only as illustrative, and not restrictive.